

## NIH Reporter Database - DB Schema

ORGANIZATION	PROJECT	APPLICATION	PUBLICATION	PRINCIPALINVESTIGATOR	AGENCY	DEPARTMENT
orgname	foanumber	applicationid	pmid	piid	icname	orgname
orgdunsnumber	fullprojectnumber	applicationtype	projectnumber	pifirstname	administeringic?	departmentid
orgfips	budgetstart	abstract	pubtitle	pilastname	fundingic?	departmentname
orgcity	budgetend		country	pis		
orgdistrict	applicationid		issn	coreprojectnum		
orgstate	fiscalyear		lang			
orgcountry	activity		pagenumber			
orgzipcode	arrafunded?		publicationdate			
	projectterms		publicationyear			
	projecttitle		journaltitle			
	projectstart		journaltitleabbr			
	projectend		journalissue			
	phr		journalvolume			
	totalcost		affiliation			
	subprojectid		authorlist			
	totalcostsubproject		pmcid			
	coreprojectnum					
	serialnumber					
	studysection					
	studysectionname					
	supportyear					
	suffix					
	cfdacode					
	programofficename					
	edinstitutetype					
	awardnoticedate					
	fundingmechanism					
	icname					
	spendingcatergory					

<pre> drop database nih; create database nih; use nih;  create table organization ( orgid integer PRIMARY KEY, orgname varchar(15), orgdunnumber integer, orgfips varchar(4), orgcity varchar(15), orgdistrict varchar(15), orgstate varchar(15), orgcountry varchar(15), orgzipcode integer );  create table department ( departmentid integer primary key, departmentname varchar(20), orgname varchar(15) references organization(orgname) );  create table application ( applicationid integer PRIMARY KEY, applicationtype varchar(15), abstract varchar(1000) );  create table agency ( icid integer primary key, icname varchar(20), administeringic integer, fundingic integer );  create table project ( foanumber varchar(15), fullprojectnumber varchar(15), budgetstart datetime, budgetend datetime, applicationid integer references application(applicationid), fiscalyear integer, activity varchar(5), arrafund integer, projectterms varchar(500), projecttitle varchar(100), projectstart datetime, projectend datetime, phr varchar(1000), totalcost decimal(12,2), subprojectid integer, totalcostsubproject integer, coreprojectnum integer PRIMARY KEY, serialnumber integer, studysection varchar(10), studysectionname varchar(50), supportyear integer, suffix varchar(10), cfdacode integer, programofficername varchar(15), edinstututype varchar(15), awardnoticdate datetime, fundingmechanism varchar(30), icname varchar(15) references agency(icname), spendingcatergorv varchar(15) ); </pre>	<pre> drop database nih; create database nih; use nih;  create table organization ( orgid integer PRIMARY KEY auto_increment, orgname varchar(15), orgdunnumber integer, orgfips varchar(4), orgcity varchar(15), orgdistrict varchar(15), orgstate varchar(15), orgcountry varchar(15), orgzipcode integer );  insert into organization (orgname,orgdunnumber,orgfips,orgcity,orgdistrict,orgstate,orgcountry,orgzipcode ) values('VIRGINIA COMMONWEALTH UNIVERSITY',105300446,'US','RICHMOND',3,'VA','UNITE insert into organization (orgname,orgdunnumber,orgfips,orgcity,orgdistrict,orgstate,orgcountry,orgzipcode ) values('UNIVERSITY OF VIRGINIA',65391526,'US','CHARLOTTESVILLE',5,'VA','UNITED STATE insert into organization (orgname,orgdunnumber,orgfips,orgcity,orgdistrict,orgstate,orgcountry,orgzipcode ) values('JOHNS HOPKINS UNIVERSITY',1910777,'US','BALTIMORE',3,'MD','UNITED STATES',2  create table department ( departmentid integer primary key auto_increment, departmentname varchar(20), orgid integer references organization(orgid) );  insert into department (departmentname, orgid) values ('BIOCHEMISTRY',1); insert into department (departmentname, orgid) values ('MICROBIOLOGY/IMMUN/VIROLOGY',2); insert into department (departmentname, orgid) values ('BIOCHEMISTRY',3);  create table application ( applicationid integer PRIMARY KEY, applicationtype varchar(15), abstract varchar(3000) );  insert into application (applicationid, applicationtype, abstract) values (8457237,'1','Chronic heart failure CHF is a leading cause of morbidity and mortality in the United States with the characteristics of sympa insert into application (applicationid, applicationtype, abstract) values (8649148,'1','DESCRIPTION (provided by applicant): It is well known that vascular stiffness increases with aging, and that the effects of a insert into application (applicationid, applicationtype, abstract) values (8455499,'1','DESCRIPTION (provided by applicant): The broad, long-term objective is to characterize phosphatidylethanolamine (PE) at  create table agency ( icname varchar(50), administeringic varchar(50), fundingic varchar(50), applicationid integer references application(applicationid) );  insert into agency (applicationid, administeringic, fundingic, icname) values (8457237,'CA','NCI:40276','NATIONAL CANCER INSTITUTE'); insert into agency (applicationid, administeringic, fundingic, icname) values (8649148,'CA','NCI:29288','NATIONAL CANCER INSTITUTE'); insert into agency (applicationid, administeringic, fundingic, icname) values (8455499,'CA','NCI:26232','NATIONAL CANCER INSTITUTE');  create table project ( foanumber varchar(15), fullprojectnumber varchar(15), budgetstart datetime, budgetend datetime, applicationid integer references application(applicationid), fiscalyear integer, activity varchar(5), arrafund VARCHAR(2), projectterms varchar(500), projecttitle varchar(100), projectstart datetime, projectend datetime, phr varchar(1000), totalcost decimal(12,2), subprojectid integer ); </pre>
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/*
create table project (
foanumber varchar(15),
fullprojectnumber varchar(15),
budgetstart datetime,
budgetend datetime,
applicationid integer references application(applicationid),
fiscalyear integer,
activity varchar(5),
arrafunded integer,
projectterms varchar(500),
projecttitle varchar(100),
projectstart datetime,
projectend datetime,
phr varchar(1000),
totalcost decimal(12,2),
subprojectid integer,
totalcostsubproject integer,
coreprojectnum varchar(20) PRIMARY KEY,
serialnumber integer,
studysection varchar(10),
studysectionname varchar(50),
supportyear integer,
suffix varchar(10),
cfdacode integer,
programofficename varchar(15),
edinstitutetype varchar(15),
awardnoticedate datetime,
fundingmechanism varchar(30),
spendingcatergory varchar(15)
);

insert into project
(foanumber,fullprojectnumber,budgetstart,budgetend,applicationid,fiscalyear,activity,arrafunded,projectterms,
projecttitle,projectstart,projectend,phr,totalcost,subprojectid,totalcostsubproject,coreprojectnum,serialnumber,
studysection,studysectionname,supportyear,suffix,cfdacode,programofficename,edinstitutetype,awardnoticedate,
fundingmechanism,spendingcatergory) values ('PA-11-110','1F30CA174231-01','09/20/2013','09/19/2014','8457237',
'2013','F30','N',
'Affect,Animals,Astrocytes,Brain,Cell Nucleus,Cells,chemokine,Chemotaxis,chemotherapy,Complex,CXCL10 gene,cytokine,Data,Development,Diagnosis,DNA Binding,Excision,Future,Glial Fibrillary Acidic P
'Role of IRF-1 dependent chemokines in glioma',
'09/20/2013','09/19/2016',
'PUBLIC HEALTH RELEVANCE: Glioblastoma Multiforme (GBM) is a highly invasive and malignant primary brain tumor that evades current aggressive treatments and initiates proinflammatory state in the b
'402761","","F30CA174231','174231','ZRG1','Special Emphasis Panel','1','398','DAMICO, MARK W',
'SCHOOLS OF MEDICINE','09/12/2013','Training, Individual","');

insert into project (foanumber,fullprojectnumber,budgetstart,budgetend,applicationid,fiscalyear,activity,arrafunded,projectterms,projecttitle,projectstart,projectend,phr,totalcost,subprojectid,totalcostsubproject,
insert into project (foanumber,fullprojectnumber,budgetstart,budgetend,applicationid,fiscalyear,activity,arrafunded,projectterms,projecttitle,projectstart,projectend,phr,totalcost,subprojectid,totalcostsubproject,"

create table publication (
pmid integer primary key,
projectnumber integer references project(coreprojectnum),
pubtitle varchar(40),
country varchar(15),
issn varchar(20),
lang varchar(10),
pagenumber integer,
publicationdate datetime,
publicationyear integer,
journaltitle varchar(20),
journaltitleabbr varchar(10),
journalissue integer,
journalvolume integer,
affiliation varchar(200),
authorlist varchar(200),
pmcid integer
);

create table principalinvestigator (
pid integer primary key,
pifirstname varchar(15),
pilalastname varchar(15),
projectnum integer references project(coreprojectnum)
);

```

NIH Reporter Database - D2RQ

Mapping

RDF

NIH Reporter Database - Mapping\_&\_RDF





map:project a d2rq:ClassMap;  
d2rq:dataStorage map:database;  
d2rq:uriPattern "project\_#@@project.coreprojectnum@@";  
d2rq:class vocab:project;  
d2rq:classDefinitionLabel "project";

map:project\_label a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property rdfs:label;  
d2rq:pattern "project #@@project.coreprojectnum@@";

map:project\_foanumber a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property vocab:project\_foanumber;  
d2rq:propertyDefinitionLabel "project foanumber";  
d2rq:column "project.foanumber";

map:project\_fullprojectnumber a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property vocab:project\_fullprojectnumber;  
d2rq:propertyDefinitionLabel "project fullprojectnumber";  
d2rq:column "project.fullprojectnumber";

map:project\_budgetstart a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property vocab:project\_budgetstart;  
d2rq:propertyDefinitionLabel "project budgetstart";  
d2rq:column "project.budgetstart";  
d2rq:datatype xsd:dateTime;

map:project\_budgetend a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property vocab:project\_budgetend;  
d2rq:propertyDefinitionLabel "project budgetend";  
d2rq:column "project.budgetend";  
d2rq:datatype xsd:dateTime;

map:project\_applicationid a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property vocab:project\_applicationid;  
d2rq:propertyDefinitionLabel "project applicationid";  
d2rq:column "project.applicationid";  
d2rq:datatype xsd:integer;

map:project\_fiscalyear a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property vocab:project\_fiscalyear;  
d2rq:propertyDefinitionLabel "project fiscalyear";  
d2rq:column "project.fiscalyear";  
d2rq:datatype xsd:integer;

map:project\_activity a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property vocab:project\_activity;  
d2rq:propertyDefinitionLabel "project activity";  
d2rq:column "project.activity";

map:project\_arrafunded a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property vocab:project\_arrafunded;  
d2rq:propertyDefinitionLabel "project arrafunded";  
d2rq:column "project.arrafunded";  
d2rq:datatype xsd:integer;

map:project\_projectterms a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property vocab:project\_projectterms;  
d2rq:propertyDefinitionLabel "project projectterms";  
d2rq:column "project.projectterms";

map:project\_projecttitle a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;  
d2rq:property vocab:project\_projecttitle;  
d2rq:propertyDefinitionLabel "project projecttitle";  
d2rq:column "project.projecttitle";

map:project\_projectstart a d2rq:PropertyBridge;  
d2rq:belongsToClassMap map:project;



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map:project_cfdacode a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:project;
d2rq:property vocab:project_cfdacode;
d2rq:propertyDefinitionLabel "project cfdacode";
d2rq:column "project.cfdacode";
d2rq:datatype xsd:integer;

map:project_programofficername a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:project;
d2rq:property vocab:project_programofficername;
d2rq:propertyDefinitionLabel "project programofficername";
d2rq:column "project.programofficername";

map:project_edinstitutetype a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:project;
d2rq:property vocab:project_edinstitutetype;
d2rq:propertyDefinitionLabel "project edinstitutetype";
d2rq:column "project.edinstitutetype";

map:project_awardnoticedate a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:project;
d2rq:property vocab:project_awardnoticedate;
d2rq:propertyDefinitionLabel "project awardnoticedate";
d2rq:column "project.awardnoticedate";
d2rq:datatype xsd:dateTime;

map:project_fundingmechanism a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:project;
d2rq:property vocab:project_fundingmechanism;
d2rq:propertyDefinitionLabel "project fundingmechanism";
d2rq:column "project.fundingmechanism";

map:project_icname a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:project;
d2rq:property vocab:project_icname;
d2rq:propertyDefinitionLabel "project icname";
d2rq:column "project.icname";

map:project_spendingcatergory a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:project;
d2rq:property vocab:project_spendingcatergory;
d2rq:propertyDefinitionLabel "project spendingcatergory";
d2rq:column "project.spendingcatergory";

# Table publication
map:publication a d2rq:ClassMap;
d2rq:dataStorage map:database;
d2rq:uriPattern "publication@{@publication.pmid@@";
d2rq:class vocab:publication;
d2rq:classDefinitionLabel "publication";

map:publication_label a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:publication;
d2rq:property rdfs:label;
d2rq:pattern "publication @{@publication.pmid@@";

map:publication_pmid a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:publication;
d2rq:property vocab:publication_pmid;
d2rq:propertyDefinitionLabel "publication pmid";
d2rq:column "publication.pmid";
d2rq:datatype xsd:integer;

map:publication_projectnumber a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:publication;
d2rq:property vocab:publication_projectnumber;
d2rq:propertyDefinitionLabel "publication projectnumber";
d2rq:column "publication.projectnumber";
d2rq:datatype xsd:integer;

map:publication_pubtitle a d2rq:PropertyBridge;
d2rq:belongsToClassMap map:publication;
d2rq:property vocab:publication_pubtitle;
d2rq:propertyDefinitionLabel "publication pubtitle";
d2rq:column "publication.pubtitle";

```



## NIH Reporter Database - Mapping\_&\_RDF

```
d2rq.belongsToClassMap map:publication;
d2rq:property vocab:publication_pmcid;
d2rq:propertyDefinitionLabel "publication pmcid";
d2rq:column "publication.pmcid";
d2rq:datatype xsd:integer;
.

<http://localhost:2020/vocab/application_applicationtype> <http://www.w3.org/2000/01/rdf-schema#label> "application applicationtype" .
<http://localhost:2020/vocab/application_applicationtype> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/1999/02/22-rdf-syntax-ns#Property> .
<http://localhost:2020/vocab/organization_orgdistrict> <http://www.w3.org/2000/01/rdf-schema#label> "organization orgdistrict" .
<http://localhost:2020/vocab/organization_orgdistrict> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/1999/02/22-rdf-syntax-ns#Property> .
<http://localhost:2020/vocab/project_icname> <http://www.w3.org/2000/01/rdf-schema#label> "project icname" .
<http://localhost:2020/vocab/project_icname> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://www.w3.org/1999/02/22-rdf-syntax-ns#Property> .
```

NIH Reporter Database - NIH Data - Project Nov 2013



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2021/2022	36	2022/2023	36
2021/2022	36	2022/2023	36
2021/2022	36	2022/2023	36
2021/2022	36	2022/2023	36
2021/2022	36	2022/2023	36



Obstacles	Intermediate Objective	Sequence	Who
Hard to understand data and relations between them.	Relational database design completed.	2	Ajay
Limited knowledge on Ontologies and RDF generation.	Online tutorials for ontology creation and survey of existing tools to generate RDF completed.	3	Ajay
Understand user query context.	Have natural language processing integrated to the system	4	Utkarsh
Mapping user query to database	Have ontology that defines the database mappings.	5	Xiaoming
Visualizations for data	Have graph APIs integrated to the system	6	All
Time is limited	Have specific tasks and deadlines	1	All
English Writing is not good.	Have the paper written finished before deadline , and double checked in the last week.	7	All













# NIH Reporter Database - NIH Data - Refined

APPLICATION_ID	ACTIVITY_ID	APPICATURAR	BUDGET	BUDGET	FDA	NFNUFFL	PFRUNDINGY	NIH SPENDING CITY	ORG_COLOR	ORG_DISTRICT	org_dens	ORG_DEB_RG	ORG_FIPRG	ORG_STATE	ORG_ZIPCODE	IC_NAME	ORG_NAME	PI_NAME	PI_ID	PROJECT	PROJECT	PROJECT	PROJECT	PHR	SERIAL	STUDY	STUDY	SUPPORT	SUFFIX	SUBPROJ	TOTAL	C TOTAL	C CORE	PRICED	CD PROGRADUE	INST AWARD	FUNDING TERMS			
8657237	F30	CA	1	N	09/20/2019/20/PA-111-1F10CA1NC1402/2013	RICHMOND	UNITED 53	105300446	BIOCHEMUS	VA	22920568	NATIONAL CANCER INSTITUTE/VIRGINIA COMMONWEALTH UNIVERSITY	YESTER, JESSI 1086015%Role of S9/02/2019/09/19/20/PUBLIC HEALTH RELEVANCE: Global 174731	ZRG1	Special E1	A0276	F30CA17398	DAMICO, SCHOOL/09/12/20 Training, Affect Animals, Astrocytes, Brain, Cell																						
8640148	F30	CA	1	N	09/23/2019/20/PA-111-1F10CA1NC2/98/2013	CHARLOTTEVILLE	UNITED 55	051931526	MICROBIS	VA	22904419	NATIONAL CANCER INSTITUTE/UNIVERSITY OF VIRGINIA	BUCKLEY, MOL 1109046%Role of S9/23/2019/09/22/20/PUBLIC HEALTH RELEVANCE: Cell 1773 ZRG1	ZRG1	Special E1	A1	29288	F30CA17398	DAMICO, SCHOOL/09/12/20 Training, adapter, Anticancer, Autoimmu																					
8545499	F31	CA	1	N	09/21/2019/20/PA-111-1F10CA1NC2/62/2013	BALTIMORE	UNITED 53	190122	BIOCHEMUS	MD	22128	NATIONAL CANCER INSTITUTE/JOHNS HOPKINS UNIVERSITY	BABATIZ, TIMO 1120397%Functionality S9/21/2019/09/11/20/PUBLIC HEALTH RELEVANCE: Desalte 174127	ZRG1	Special E1	26232	F31CA17398	DAMICO, SCHOOL/09/12/20 Training, Animal Model, base, Biological, Biolo																						
8653213	F31	CA	1	N	09/18/2019/20/PA-111-1F10CA1NC2/10/2013	CHICAGO	UNITED 54	068195277	BIOCHEMUS	IL	22904419	NATIONAL CANCER INSTITUTE/UNIVERSITY OF CHICAGO	TAKEUCHI, KAZUO 1120397%Functionality S9/18/2019/09/11/20/PUBLIC HEALTH RELEVANCE: Desalte 174127	ZRG1	Special E1	27893	F31CA17398	DAMICO, SCHOOL/09/12/20 Training, Animal Model, base, Biological, Biolo																						
8651577	F31	CA	1	N	09/17/2019/20/PA-111-1F10CA1NC4/16/2013	PHILADELPHIA	UNITED 52	2604817	BIOCHEMUS	PA	19104	NATIONAL CANCER INSTITUTE/REEDER UNIVERSITY	FERRER, CRISTI 117564#Neurotrauma S9/17/2019/09/16/20/PUBLIC HEALTH RELEVANCE: Breast 183874	ZRG1	Special E1	41693	F31CA17398	BINI, ALESCHOOL/09/20/20 Training, Aerobic, aerobic, glycolysis, Ad																						
8647627	F32	DC	1	N	10/01/2019/20/PA-111-1F10CA1NC5/2013	SAN FRANCISCO	UNITED 52	94878337	NEUROSCUS	CA	94143096	NATIONAL INSTITUTE ON DEPARTMENT OF CALIFORNIA SAN FRANCISCO	LEONARD, MEL 1121174#Neurotrauma S9/01/2019/09/30/20/PUBLIC HEALTH RELEVANCE: Developt 14600	ZDC1	Special E1	A1	52190	F32DC01173	SKLARE, SCHOOL/09/20/20 Training, Access to Information, Acoustics, Ad																					
8552151	F32	DC	1	N	08/01/2019/20/PA-111-1F10CA1NC6/4/2013	BOSTON	UNITED 52	161201212	BIOCHEMUS	WI	537151218	NATIONAL INSTITUTE OF GENOMIC ENGINEERING/WISCONSIN-MADISON	PRESTON, MEL 102873GM#Neurotrauma S9/01/2019/09/16/20/PUBLIC HEALTH RELEVANCE: Poly(U) 103130	ZRG1	Special E1	A1	53942	F32GM1659	READY, FEARTH S/01/20/20 Training, Address, Africa, Behavioral, Biolog																					
8529110	F32	DC	1	N	08/01/2019/20/PA-111-1F10CA1NC6/4/2013	PASADENA	UNITED 52	9501836	GENETICS	CA	94143096	NATIONAL INSTITUTE FOR ADVANCED NATIONAL CENTER FOR ADVANCING TRANSLATIONAL SCIENCE	LACK, JUSTIN 111184#Neurotrauma S9/01/2019/09/16/20/PUBLIC HEALTH RELEVANCE: Recruit 14600	ZDC1	Special E1	A1	49754	F32GM1659	READY, FEARTH S/01/20/20 Training, Address, Africa, Behavioral, Biolog																					
8534335	F32	DC	1	N	07/01/2019/20/PA-111-1F10CA1NC6/4/2013	SALT LAKE CITY	UNITED 52	9095365	GENETICS	UT	94112	NATIONAL INSTITUTE OF GENOMIC ENGINEERING/WISCONSIN-MADISON	BARBER, MART 114473GM#Neurotrauma S9/01/2019/09/20/20/PUBLIC HEALTH RELEVANCE: Infectio 100288	ZRG1	Special E1	A1	49314	F32GM1659	JAMES, D/SCHOOL/06/12/20 Training, Affect, Affinity, Allies, Antibiot, Red																					
8534300	F32	DC	1	N	08/01/2019/20/PA-111-1F10CA1NC6/4/2013	STANFORD	UNITED 51B	9242142	BIOLOGY	CA	943056203	NATIONAL INSTITUTE OF GEN/STANFORD UNIVERSITY	CHARTRON, JU 1163433#Reciper S9/01/2019/09/16/20/PUBLIC HEALTH RELEVANCE: Neurode 108325	ZRG1	Special E1	A1	47114	F32GM1659	FUCKEN, SCHOOL/07/01/20/20 Training, Aging, Architecture, base, Binding, IM																					
8485037	I01	VA	1	N	10/01/2019/30/20/RFA-HX-1101HX0	2014	TAMPA	UNITED 514	929194256	US	FL	336124745	Veterans Affairs	JAMES A. HALEY VA MEDICAL CENTER	LUTHER, STEPH 9473851#Leveragi	10/01/2019/09/30/20/strategies, thereby reducing the burde	H092	HSR3	HSR-3 In 1	A1		I01HX00/999																		
8397641	I01	VA	1	N	10/01/2019/30/20/RFA-HX-1101HX0	2014	LOS ANGELES	UNITED 53	66689118	US	CA	900731003	Veterans Affairs	VA GREATER LOS ANGELS HEALTHCARE SYSTEM	LORENZ, KARL 9443091#Effective	10/01/2019/03/31/20/provide insight into an implementatio	938	HCR5	1			I01HX00/999																		
8399359	I01	VA	1	N	10/01/2019/30/20/RFA-HX-1101HX0	2014	SALT LAKE CITY	UNITED 52	9094756	US	UT	84148	Veterans Affairs	VA SALT LAKE CITY HEALTHCARE SYSTEM	GARVIN, JENN 8908572#Automat	10/01/2019/09/30/20/hospitals, thereby reducing patient r	984	HCR8	1			I01HX00/999																		
8481722	I01	VA	1	N	10/01/2019/30/20/RFA-HX-1101HX0	2014	INDIANAPOLIS	UNITED 57	608434697	US	IN	46202	Veterans Affairs	RVR VA MEDICAL CENTER	DAGGETT, VIR 11616801#Telepho	10/01/2019/09/30/20/intake programs to remediate drug	9120	HSR8	Service C 1			I01HX00/999																		
8484541	I01	VA	1	N	10/01/2019/30/20/RFA-HX-1101HX0	2014	MINNEAPOLIS	UNITED 55	71774624	US	MN	55417	VETERANS AFFAIRS	NATIONAL INSTITUTE ON DEAF BLINDNESS/DOIT COMMUNICATION DISORDERS	MATTHIASSEN, L 110318#Audiology S9/01/2019/09/30/20/intake programs to remediate drug	9120	HSR8	Service C 1			I01HX00/999																			
8705662	ZU0	DC	1	N	09/21/2019/30/20/RFA-HX-1101HX0	2014	NEW YORK	UNITED 513	621889815	US	NY	100323702	NATIONAL INSTITUTE/COLUMBIA UNIVERSITY HEALTH SCIENCES	GEVING, MA 941450#Audiology	ZRG1	Subcom 39	S4	9045	75000	PBC001																				
8707192	P30	DC	1	N	07/01/2019/30/20/RFA-HX-1101HX0	2014	WISAKA	ZAMBIA	56548793	US	NY	10101	COORDINATING OFFICE OF GLUMLYNN TEACHING HOSPITAL	KALIFANO, CH 8774270#BIMD S9/07/2019/06/30/20/	ZRG1	Special E3	78	ZU2GH0																						
8751920	U20	GH	3	N	09/12/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	81	ZU2GH0																							
8748287	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	81	ZU2GH0																							
8752521	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757594	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	107	ZU2GH0																							
8757594	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757594	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8748508	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757252	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757252	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757252	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757252	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757252	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757252	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757252	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757252	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO	BUZZELLA, PROF 1101117093#P&R S9/12/2019/09/29/20/	ZRG1	Special E3	100	ZU2GH0																							
8757252	U20	GH	3	N	09/30/2019/30/20/RFA-HX-1101HX0	WISAKA	ZAMBIA	56548793	CB	US	905492673	YAUONDE CAMERO																												

## NIH Reporter Database - Sheet19

APPLICATION/ACTIVITY	APPLICATION/TIERRA FUNDED BUDGET START/BUDGET END	FOA NUMBER	FULL PROJECT FUNDING Yr's	YR	NH SPENDING	ORG CITY	ORG COUNTRY/ORG DISTRICT	Org	ORG DUNS	ORG DEPT	ORG TIPS	ORG STATE	ORG ZIPCODE	IC NAME	ORG NAME	PI NAME	PR ID	PROJECT TITLE	PROJECT START/END	PRIM	SERIAL NUMBER/STUDY SECTION/STUDY SECTION NAME	SUPPORT YEAR/SUFFIX	SUBPROJECT	STOTAL COST	TOTAL COST SUB IN/CORE PROJECT	CYCLIC CODE	PROGRAM OFFERED INST TYPE	AWARD NOTICE/FUNDING MECH/TERMS	
8451237	F30	CA	1	N	09/02/2013	09/19/2014	PA-11-110	1F30CA174231-NCI-40276	2013	RICHMOND	UNITED STATES	3	101030446	BIOCHEMISTRY US	VA	212280558	NATIONAL CANCER INSTITUTE, BETHESDA	10860151	Role of PI-1 de 09/20/2013	09/19/2014	PUBLIC HEALTH/174231	ZKG1	Special Emphasis Panel	A2	40276	174231	398	DAMIC, MARK SCHOOLS OF MED/12/2013	Training, Indivd/After/Animals
8451238	F30	CA	1	N	09/02/2013	09/19/2014	PA-11-111	1F30CA174237-NCI-20232	2013	BALTIMORE	UNITED STATES	3	19107777	BIOCHEMISTRY US	MD	212228	NATIONAL CANCER INSTITUTE, BETHESDA	11203978	Functional Impx 09/12/2013	09/11/2014	PUBLIC HEALTH/174127	ZKG1	Special Emphasis Panel	A2	20232	174127	398	DAMIC, MARK SCHOOLS OF MED/12/2013	Training, Indivd/Animal Model
8455499	F31	CA	1	N	09/12/2013	09/11/2014	PA-11-111	1F31CA174127-NCI-20232	2013																				

org_id	ORG_NAME	ORG_DUN	ORG_FIP	ORG_DISTRICT	ORG_STATE	ORG_CTRY	ORG_ZIP	ORG_DEP																
1	VIRGINIA COM 10530044 US	RICHM3	VA	UNITE 2229095	BIOCHEM	insert into organization (orgname,orgdunnumber,orgfips,orgcty,orgdistrict,orgstate,orgcountry,orgzipcode ) values ('VIRGINIA COM 10530044 US','RICHM3','VA','UNITE 2229095','BIOCHEM')																		
2	UNIVERSITY O 65391524 US	CHARL5	VA	UNITE 2290441	MICROBIC	insert into organization (orgname,orgdunnumber,orgfips,orgcty,orgdistrict,orgstate,orgcountry,orgzipcode ) values ('UNIVERSITY O 65391524 US','CHARL5','VA','UNITE 2290441','MICROBIC')																		
3	JOHNS HOPKII 1910777 US	BALTII3	MD	UNITE 21228	BIOCHEM	insert into organization (orgname,orgdunnumber,orgfips,orgcty,orgdistrict,orgstate,orgcountry,orgzipcode ) values ('JOHNS HOPKII 1910777 US','BALTII3','MD','UNITE 21228','BIOCHEM')																		
orgid	ORG_DUN	ORG_DEP																						
1	105300446	BIOCHEMI	insert into department (departmentname, orgid) values ('BIOCHEMISTRY' );																					
2	65391524	MICROBIC	insert into department (departmentname, orgid) values ('MICROBIOLOGY/IMMUN/VIROLOGY' );																					
3	1910777	BIOCHEMI	insert into department (departmentname, orgid) values ('BIOCHEMISTRY' );																					
APPLIK	APPLICATION	ABSTRACT																						
845721	Chronic hea		insert into application (applicationid, applicationtype, abstract) values (8457237,'Chronic heart failure CHF is a k');																					
864911	SCRIPTI		insert into application (applicationid, applicationtype, abstract) values (8649148,'DESCRIPTION ( provided by ap');																					
845541	SCRIPTI		insert into application (applicationid, applicationtype, abstract) values (8455499,'DESCRIPTION ( provided by ap');																					
APPLIK	ADMINISTER	FUNDING_IC_NAME																						
84573	CA	NCI:40271 NATIONA	insert into agency (applicationid, administeringic, fundingic, icname) values (8457237,'CA','NCI:40276','NATIONAL');																					
86491	CA	NCI:29281 NATIONA	insert into agency (applicationid, administeringic, fundingic, icname) values (8649148,'CA','NCI:29285','NATIONAL');																					
84554	CA	NCI:26232 NATIONA	insert into agency (applicationid, administeringic, fundingic, icname) values (8455499,'CA','NCI:26232','NATIONAL');																					
FOA	FULL_PROJECT_BUDGET	PROJECT_APPLICY	ACTI	ARRA	TERMS	PROJECT	PROJECT_START	PROJE	PHR	TOTAL_SUBLPR	TOTAL_CORE	PROJECT_NUM	SERIAL_STUDY	SI_STUDY_SE	SUPPOR	SUFFIX	CFDA	COI	PROGRAM_OFFI	ED	INST_TYPE	AWARD_NOTICE	FUNDING_MECH	NIH_SPENDING
PA-11-1F30CA1742	09/20/20109/19/2013	084572	2013	F30	N	Affect,An Role of IR	09/20/2013	09/19/	PUBLIC	I40276	F30CA174231	17423	ZRG1	Special Em 1	398	DAMICO, MARK	SCHOOLS OF M	09/12/2013	Training, Individ				insert into project (fk)	
PA-11-1F30CA1771	09/23/20109/22/2013	086491	2013	F30	N	adapter; Role of SI	09/23/2013	09/22/	PUBLIC	I29288	F30CA17173	17717	ZRG1	Special Em 1	A1	398	DAMICO, MARK	SCHOOLS OF M	09/17/2013	Training, Individ				insert into project (fk)
PA-11-1F31CA1741	09/12/20109/11/2013	0845549	2013	F31	N	Animal M	Function	09/12/2013	09/11/	PUBLIC	I26232	F31CA174127	17412	ZRG1	Special Em 1	398	DAMICO, MARK	SCHOOLS OF M	09/12/2013	Training, Individ				insert into project (fk)
pid	pfirstname	pilastname	application																					
10860	YESTER	JESSIE	8457237	insert into principalinvestigator (pid, pfirstname, pilastname, applicationid) values (10860152,'YESTER','JESSIE');																				
11009	BUCKLEY	MONICA W	8649148	insert into principalinvestigator (pid, pfirstname, pilastname, applicationid) values (11009461,'BUCKLEY','MONICA');																				
11203	BABATZ	TIMOTHY D	8455499	insert into principalinvestigator (pid, pfirstname, pilastname, applicationid) values (11203978,'BABATZ','TIMOTHY');																				
pmid	projectnumber	publis	country	isbn	lang	page	pubdat	pubyear	journals	journals	journals	journals	journals	journals	journals	journals	journals	journals	journals	journals	journals	journals	journals	
233756	F30CA17423	End-stage	n United Sta	1538-93	eng	242	2013	A 2013	Journal of U	Am Med Dir Assoc	4	14	Division Hall, Reel	3605191	insert int									
233759	F30CA17423	Combinato	n United Sta	1878-59	eng	3422	2013	A 2013	Biomaterial	Biomaterials	13	34	J. Crayt Acharya,	3605192	insert int									
233759	F31CA17412	Functional o	Netherland	1573-28	eng	146	2013	M 2013	Schizophre	Schizophr Res	13	144	Departm McClure,	3572293	insert int									

```

drop database nih;

create database nih;

use nih;

create table organization (
    orgid integer PRIMARY KEY auto_increment,
    orgname varchar(15),
    orgdunsnumber integer,
    orgfips varchar(4),
    orgcity varchar(15),
    orgdistrict varchar(15),
    orgstate varchar(15),
    orgcountry varchar(15),
    orgzipcode integer
);

insert into organization (orgname,orgdunsnumber,orgfips,orgcity,orgdistrict,orgstate,orgcountry,orgzipcode ) values("VIRGINIA COMMONWEALTH UNIVERSITY",
105300446,'US','RICHMOND',3,'VA','UNITED STATES',232980568);
insert into organization (orgname,orgdunsnumber,orgfips,orgcity,orgdistrict,orgstate,orgcountry,orgzipcode ) values('UNIVERSITY OF VIRGINIA',
65391526,'US','CHARLOTTESVILLE',5,'VA','UNITED STATES',229044195);
insert into organization (orgname,orgdunsnumber,orgfips,orgcity,orgdistrict,orgstate,orgcountry,orgzipcode ) values('JOHNS HOPKINS UNIVERSITY',
1910777,'US','BALTIMORE',3,'MD','UNITED STATES',21228);

create table department (
    departmentid integer primary key auto_increment,
    departmentname varchar(20),
    orgid integer references organization(orgid)
);

insert into department (departmentname, orgid) values ('BIOCHEMISTRY',1);
insert into department (departmentname, orgid) values ('MICROBIOLOGY/IMMUN/VIROLOGY',2);
insert into department (departmentname, orgid) values ('BIOCHEMISTRY',3);

create table application (
    applicationid integer PRIMARY KEY,
    applicationtype varchar(15),
    abstract varchar(3000)
);

insert into application (applicationid, applicationtype, abstract) values (8457237,'1','Chronic heart failure CHF is a leading cause of morbidity and mortality in the United States with the characteristics of sympathetic overactivity and activation of the renin-angiotensin system. These are the primary therapeutic targets for this syndrome. In this project, we propose three aims to explore the potential benefit of over expressing angiotensin type 2 receptor (AT2R) expression in the rostral ventrolateral medulla (RVLM) in rats with CHF. Moreover we will also determine the underlying mechanisms involved in the sympatho-inhibitory effects of AT2R overexpression in the RVLM. It has been firmly established that, in contrast to the influences of the AT1R, the AT2R facilitates the neuronal potassium channel and current, which hyperpolarizes membrane potential and')

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suppresses neuronal excitability. On the other hand, our preliminary experiments show a down regulation of AT2R protein expression in the RVLM of rats with CHF. These phenomena lead us to postulate that a decrease in AT2R signaling in the RVLM contributes to sympatho-excitation of this syndrome by elevating the excitability of presynaptic neurons. Our global hypothesis in this proposal is that over expression of the AT2R in the RVLM by gene transfer will reduce or normalize sympathetic activation in CHF, and therefore benefit this syndrome. In preliminary experiments, we have successfully produced a rat model in which the AT2R is selectively over expressed in the RVLM by direct delivery of AT2R viral vectors into this area. Employing this animal model, we will test our hypothesis by pursuing the following 3 Specific Aims. AIM 1: To determine the hemodynamic, cardiac function, and sympathetic outflow in normal and CHF rats with overexpression of AT2R in the RVLM. This Aim includes two components. First, we will determine the chronic effects of over expressing AT2R in the RVLM on arterial blood pressure (AP), heart rate (HR), cardiac function, and norepinephrine excretion in conscious normal and CHF rats. In addition, water intake, urine excretion, and body weight will be measured. Second, we will observe the acute effects of microinjecting agonists and antagonists of AT1R and AT2R into the RVLM with AT2R over expression on AP, HR, and renal sympathetic nerve activity (RSNA). We will also explore the involvement of intracellular AR2R signaling sympatho-inhibition. This includes the NO/cGMP and PLA2/AA/12-LO/PP2A pathways. AIM 2: To determine the effects of overexpressing AT2R on single presynaptic neuronal activity in the RVLM of anesthetized rats. We will directly record extracellular single unit firing of RVLM presynaptic neurons following overexpression of AT2R. AIM 3: To determine the effects of overexpressing AT2R on potassium current of presynaptic neurons in the RVLM. Employing patch clamp and brainstem slice preparations, we will directly record potassium currents of presynaptic neurons following overexpression of AT2R. These studies will lead to an enhanced understanding of angiotensin signaling in presynaptic neurons in the setting of CHF. They will highlight the importance of a balance between AT1 and AT2 receptor signaling in setting the level of sympatho-excitation and identify possible new targets for therapy in CHF.';

insert into application (applicationid, applicationtype, abstract) values (8649148,'1','DESCRIPTION (provided by applicant): It is well known that vascular stiffness increases with aging, and that the effects of aging on arterial stiffness are relatively protected in older women. Although most prior mechanistic work on the effects of aging on vascular regulation and stiffness has been conducted in rodent models, the extent to which these data can be extrapolated to humans is limited by the marked differences in lifespan over which changes in vascular stiffness develop. Studies of gender differences with aging are even more limited in rodents, due to the fact that the estrogen levels never decline even in very old rodents, and they do not go through menopause. It is generally agreed that non-human primates are the best models to study gender differences with aging, since the changes in hormones and menstruation in old female (OF) monkeys parallel those in older human females. Our previous studies and preliminary data in aging monkeys have demonstrated that the stiffness of the aorta increases with aging and this aging alteration is greater in males than females, and also much greater in the abdominal aorta (AA) vs. the thoracic aorta (TA), which is only partially explained by variance in extracellular matrix (ECM). Here, we will test the novel Hypothesis that intrinsic mechanisms in the vascular smooth muscle cells (VSMCs) as well as alterations in VSMC-ECM interaction also contribute to the increased stiffness of the aorta in older males, particularly the AA, and conversely, contribute to the protection in pre-menopausal females. This Hypothesis is supported by Preliminary Data demonstrating enhanced stiffness of VSMC in culture from old male (OM) aortas and showing that the number of senescent VSMC increases in OM compared to young males (YM), particularly in AA. Specifically, we will test our Hypothesis through two approaches. In the first approach, we will determine how VSMC stiffness and senescence are affected by age and gender using atomic force microscopy (AFM) and also an artificial tissue model. In the second approach, we will determine both *in vivo* and *in vitro* how these factors may explain the regional differences in aortic stiffness between TA and AA. PUBLIC HEALTH RELEVANCE: The increase in vascular stiffness is a major health problem for an increasing aging population in the US. This grant is directed at examining mechanisms inherent in this process which ultimately could be approached therapeutically. ');

insert into application (applicationid, applicationtype, abstract) values (8455499,'1','DESCRIPTION (provided by applicant): The broad, long-term objective is to characterize phosphatidylethanolamine (PE) at the luminal endothelial surface, and develop new biomarkers for vascular health and diseases. Accumulating evidence from past decades demonstrates that PE is an important anticoagulant. However, the distribution and dynamics of PE at the blood-endothelium interface remain virtually unknown due to a lack of investigative probes. Recently, we developed PE-specific molecular probes derived from Duramycin, which bind PE with high affinity and high specificity. Using these probes, important preliminary data were obtained in support of the current project. First, we discovered an extraordinarily high level of PE at the luminal endothelial surface of aortic flow dividers and along the ascending aorta. Second, these vascular regions are also the primary targets for anti-PE (aPE) autoimmunity, providing a physical link between aPE and idiopathic thrombosis. In addition, cultured endothelial cells upregulate surface PE when subject to shear stress, thereby suggesting a flow-mediated regulatory mechanism. Furthermore, we documented that PE at the blood-endothelium interface is severely suppressed in hypertensive, as opposed to normotensive, vessels. In light of the preliminary data, the primary goal of this project is to better characterize vascular PE. Four Specific Aims are proposed to: 1) Synthesize and characterize Duramycin-derived PE-specific molecular probes, in particular, the gadolinium-labeled T1 agents for high-resolution, target-specific MRI. 2) Explore the mechanism of flow-mediated PE upregulation in endothelial cells, where we hypothesize that the modulation of surface PE is governed by a mechanotransduction process in response to shear stress. 3) Determine the normal distribution profile of vascular PE on a tissue level using target-specific MRI; we hypothesize that the level of PE at the luminal endothelial surface correlates with the degree of hemodynamic stress. 4) Characterize PE in hypertensive vasculature using various rat models of hypertension and in response to antihypertensive therapies. We hypothesize that the vascular PE is a marker for endothelial dysfunction associated with hypertension. Overall, new knowledge about PE at the blood-endothelium interface will enhance our understanding of the regulation and impairment of hemostasis. In turn, these discoveries regarding the dynamics of vascular PE will give rise to new biomarkers for endothelial health, and the progression and treatments of vascular anomalies. RELEVANCE TO PUBLIC HEALTH The characterization of

PE, as a critical anticoagulant in the vasculature, will help us understand the modulation of the thrombotic potential of the circulating blood by the endothelium. The dynamics of vascular PE will provide important information regarding the thrombotic disorders and endothelial dysfunction in vascular diseases. PUBLIC HEALTH RELEVANCE: Phosphatidylethanolamine (PE) is an important anticoagulant in the circulatory system. The goal of this project is to characterize the distribution and dynamics of PE at the blood-endothelium surface using high-resolution, target-specific imaging. The findings will enhance our understanding in the regulation and impairment of hemostasis, which will lead to new imaging biomarkers for vascular health, anomalies and therapeutic efficacies. DESCRIPTION (provided by applicant): The broad, long-term objective is to characterize phosphatidylethanolamine (PE) at the luminal endothelial surface, and develop new biomarkers for vascular health and diseases. Accumulating evidence from past decades demonstrates that PE is an important anticoagulant. However, the distribution and dynamics of PE at the blood-endothelium interface remain virtually unknown due to a lack of investigative probes. Recently, we developed PE-specific molecular probes derived from Duramycin, which bind PE with high affinity and high specificity. Using these probes, important preliminary data were obtained in support of the current project. First, we discovered an extraordinarily high level of PE at the luminal endothelial surface of aortic flow dividers and along the ascending aorta. Second, these vascular regions are also the primary targets for anti-PE (aPE) autoimmunity, providing a physical link between aPE and idiopathic thrombosis. In addition, cultured endothelial cells upregulate surface PE when subject to shear stress, thereby suggesting a flow-mediated regulatory mechanism. Furthermore, we documented that PE at the blood-endothelium interface is severely suppressed in hypertensive, as opposed to normotensive, vessels. In light of the preliminary data, the primary goal of this project is to better characterize vascular PE. Four Specific Aims are proposed to: 1) Synthesize and characterize Duramycin-derived PE-specific molecular probes, in particular, the gadolinium-labeled T1 agents for high-resolution, target-specific MRI. 2) Explore the mechanism of flow-mediated PE upregulation in endothelial cells, where we hypothesize that the modulation of surface PE is governed by a mechanotransduction process in response to shear stress. 3) Determine the normal distribution profile of vascular PE on a tissue level using target-specific MRI; we hypothesize that the level of PE at the luminal endothelial surface correlates with the degree of hemodynamic stress. 4) Characterize PE in hypertensive vasculature using various rat models of hypertension and in response to antihypertensive therapies. We hypothesize that the vascular PE is a marker for endothelial dysfunction associated with hypertension. Overall, new knowledge about PE at the blood-endothelium interface will enhance our understanding of the regulation and impairment of hemostasis. In turn, these discoveries regarding the dynamics of vascular PE will give rise to new biomarkers for endothelial health, and the progression and treatments of vascular anomalies. RELEVANCE TO PUBLIC HEALTH The characterization of PE, as a critical anticoagulant in the vasculature, will help us understand the modulation of the thrombotic potential of the circulating blood by the endothelium. The dynamics of vascular PE will provide important information regarding the thrombotic disorders and endothelial dysfunction in vascular diseases. PUBLIC HEALTH RELEVANCE: Phosphatidylethanolamine (PE) is an important anticoagulant in the circulatory system. The goal of this project is to characterize the distribution and dynamics of PE at the blood-endothelium surface using high-resolution, target-specific imaging. The findings will enhance our understanding in the regulation and impairment of hemostasis, which will lead to new imaging biomarkers for vascular health, anomalies and therapeutic efficacies.');

```
create table agency (
agencyid integer primary key auto_increment,
icname varchar(50),
administeringic varchar(50),
fundingic varchar(50),
applicationid integer references application(applicationid)
);
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insert into agency (applicationid, administeringic, fundingic, icname) values (8457237,'CA','NCI:40276','NATIONAL CANCER INSTITUTE');
insert into agency (applicationid, administeringic, fundingic, icname) values (8649148,'CA','NCI:29288','NATIONAL CANCER INSTITUTE');
insert into agency (applicationid, administeringic, fundingic, icname) values (8455499,'CA','NCI:26232','NATIONAL CANCER INSTITUTE');
```

```
create table project (
foanumber varchar(15),
fullprojectnumber varchar(15),
budgetstart datetime,
budgetend datetime,
applicationid integer references application(applicationid),
fiscalyear varchar(4),
activity varchar(5),
```

```

arrafunded VARCHAR(2),
projectterms varchar(500),
projecttitle varchar(100),
projectstart datetime,
projectend datetime,
phr varchar(1000),
totalcost decimal(12,2),
subprojectId integer,
totalcostsubproject integer,
coreprojectnum varchar(20) PRIMARY KEY,
serialnumber integer,
studysection varchar(10),
studysectionname varchar(50),
supportyear integer,
suffix varchar(10),
cfdacode integer,
programofficername varchar(15),
edinstitutetype varchar(15),
awardnoticedate datetime,
fundingmechanism varchar(30),
spendingcatergory varchar(15)
);

```

```

insert into project
(foanumber,fullprojectnumber,budgetstart,budgetend,applicationid,fiscalyear,activity,arrafunded,projectterms,
projecttitle,projectstart,projectend,phr,totalcost,subprojectId,totalcostsubproject,coreprojectnum,serialnumber,
studysection,studysectionname,supportyear,suffix,cfdacode,programofficername,edinstitutetype,awardnoticedate,
fundingmechanism,spendingcatergory) values ('PA-11-110','1F30CA174231-01','09/20/2013','09/19/2014','8457237',
'2013','F30','N',
'Affect,Animals,Astrocytes,Brain,Cell Nucleus,Cells,chemokine,Chemotaxis,chemotherapy,Complex,CXCL10 gene,cytokine,Data,Development,Diagnosis,DNA Binding,
Excision,Future,Glia Fibrillary Acidic Protein,Glioblastoma,Glioma,Histology,Human,human IRAK1 protein,Immune system,In Vitro,in vivo,Inflammatory Response,Interferon
Regulatory Factor 1,Interleukin-1,IRAK1 gene,Knockout Mice,Lead,Link,Malignant - descriptor,Malignant Neoplasms,Mediating,migration,Modeling,Modification,monocyte,
mouse interferon regulatory factor 1,mouse model,Mus,NF-kappa B,Oncogenic,Operative Surgical Procedures,outcome forecast,Patients,Phosphorylation,
Phosphotransferases,Polyubiquitination,Primary Brain Neoplasms,Promotor (Genetics),Protein-Serine-Threonine Kinases,public health relevance,Radiation,RANTES,receptor,
Recombinants,Recruitment Activity,Recurrence,Refractory,Reporting,response,Role,Serine,Staining method,Stains,Survival Rate,T-Lymphocyte,Testing,therapy development,
Threonine,transcription factor,tumor,tumor growth,tumor microenvironment,Tumor Suppressor Proteins,Tyrosine,',
'Role of IRF-1 dependent chemokines in glioma',
'09/20/2013','09/19/2016',
'PUBLIC HEALTH RELEVANCE: Glioblastoma Multiforme (GBM) is a highly invasive and malignant primary brain tumor that evades current aggressive treatments and
initiates proinflammatory state in the brain characterized by the presence of cytokines, including IL-1. We found that IL-1 regulates expression of CCL5 and CXCL10
chemokines in astrocytes via the activation of interferon regulatory factor 1 (IRF-1) that includes its K63-linked polyubiquitinatio. Astrocyte-derived CCL5 and CXCL10 can
promote the proliferation, migration, and invasion of GBM cells in vivo. Thus, understanding whether activation of IRF-1, CXCL10, and CCL5 in astrocytes contributes to GBM
development and progression is critical, and may also lead to development of therapies in the future.',
'40276','','F30CA174231','174231','ZRG1','Special Emphasis Panel','1','398','DAMICO, MARK W',
'SCHOOLS OF MEDICINE','09/12/2013','Training, Individual');");

```

insert into project (foanumber,fullprojectnumber,budgetstart,budgetend,applicationid,fiscalyear,activity,arrafunded,projectterms,projecttitle,projectstart,projectend,phr,totalcost,subprojectid,totalcostsubproject,coreprojectnum,serialnumber,studysection,studysectionname,supportyear,suffix,cfdacode,programofficername,edinstitutetype,awardnoticedate,fundingmechanism,spendingcatergory) values ('PA-11-110','1F30CA177173-01A1','09/23/2013','09/22/2014','8649148','2013','F30','N','adapter protein, Antigens, Autoimmunity, Binding (Molecular Function), Bone Marrow, CD3 Antigens, CD8B1 gene, Cell Surface Receptors, Cells, Commit, Cues, Data, Defect, Development, Ensure, Event, Genes, Health, Hematopoietic Neoplasms, Human, Immune response, Immune system, Infection, insight, Investigation, Kinetics, Laboratories, Lead, leukemia/lymphoma, Link, Lymphoid, Malignant Neoplasms, Manuscripts, Mature T-Lymphocyte, Molecular, Mus, new therapeutic target, novel, Organ, Pathway interactions, Peripheral, Play, precursor cell, Process, Proliferating, Proteins, public health relevance, Role, Signal Transduction, Staging, System, T cell response, T-Cell Activation, T-Cell Development, T-Cell Leukemia, T-Cell Lymphoma, T-Cell Receptor, T-Lymphocyte, Testing, Thymic Lymphoma, thymocyte, Thymocyte Development, Thymus Gland, Up-Regulation (Physiology)', 'Role of Shcbp1 (mPAL) in T Cell Development and Function','09/23/2013','09/22/2017','PUBLIC HEALTH RELEVANCE: T cell leukemia and lymphomas are aggressive blood cancers and approximately 15-25% of all acute lymphoblastic leukemias (ALL) are T-cell. T cell acute lymphoblastic leukemia (T-ALL) arises in the thymus of thymocytes at known stages of development and eventually infiltrates the bone marrow, peripheral lymphoid system, and other organs. Although less understood, there is also a group of T cell lymphomas that arise from transformations of mature peripheral T cells. The molecular mechanisms that control normal T cell development and activation are also involved in oncogenetic transformation, and understanding the mechanisms of normal development and activation may lead to new therapeutic targets for T cell leukemia and lymphoma. Our studies focus on a novel protein, Shcbp1, which we believe is involved in regulating proliferation during T cell development and during the primary immune response and may be dysregulated in T cell leukemia and lymphoma.', '29288','','F30CA177173','177173','ZRG1','Special Emphasis Panel','1','A1','398','DAMICO, MARK W','SCHOOLS OF MEDICINE','09/17/2013','Training, Individual');

insert into project (foanumber,fullprojectnumber,budgetstart,budgetend,applicationid,fiscalyear,activity,arrafunded,projectterms,projecttitle,projectstart,projectend,phr,totalcost,subprojectid,totalcostsubproject,coreprojectnum,serialnumber,studysection,studysectionname,supportyear,suffix,cfdacode,programofficername,edinstitutetype,awardnoticedate,fundingmechanism,spendingcatergory) values ('PA-11-111','1F31CA174127-01','09/12/2013','09/11/2014','8455499','2013','F31','N','Animal Model,base, Biological, Biological Assay, cancer gene expression, cancer genome, cancer risk, cell growth, Characteristics, cohort, Complementary DNA, Complex, Disease, disease phenotype, Event, Gene Expression, Genes, Genetic, Genetic Polymorphism, Genetic Predisposition to Disease, Genetic Screening, Genetic Transcription, genome wide association study, Genomics, Genotype, Goals, Haplotypes, Health, Human, Human Cell Line, innovation, insight, Linkage Disequilibrium, Malignant Neoplasms, Maps, Mediating, Mutagenesis, novel, Outcome, Pathology, Phenotype, Population, Predisposition, Process, Proto-Oncogenes, public health medicine (field), public health relevance, Publishing, Repetitive Sequence, Reporter Genes, Reporting, Research, Retroelements, Retrotransposon, Reverse Transcriptase Polymerase Chain Reaction, Risk, risk variant, Role, Signal Transduction, Single Nucleotide Polymorphism, Somatic Mutation, Source, Structure, success, Technology, Testing, trait, Transcript, Tumor Suppressor Genes, tumorigenesis, Variant, Work, 'Functional Impact of Retrotransposon Insertion Polymorphisms at Cancer Risk Loci','09/12/2013','09/11/2016','PUBLIC HEALTH RELEVANCE: Despite the success of genome-wide association studies (GWAS) in generating statistically-significant and reproducible associations between human genomic variation and cancer risk, the current gap between statistical association and biological significance remains a critical problem. Our long-range goal is to understand the functional impact of retrotransposon insertion polymorphisms (RIPs), an under-ascertained source of human genomic variation that remains relatively unexplored, in generating GWAS signals in studies of cancer. The proposed research will elucidate relationships between genomic variation, gene expression, and cancer risk, an important public health problem.', '26232','','F31CA174127','174127','ZRG1','Special Emphasis Panel','1','398','DAMICO, MARK W','SCHOOLS OF MEDICINE','09/12/2013','Training, Individual');

```
create table publication (
pmid integer primary key,
projectnumber integer references project(coreprojectnum),
pubtitle varchar(40),
country varchar(15),
issn varchar(20),
lang varchar(10),
pagenumber integer,
publicationdate datetime,
publicationyear integer,
journaltitle varchar(20),
journaltitleabbr varchar(10),
```

```
journalissue integer,  
journalvolume integer,  
affiliation varchar(200),  
authorlist varchar(200),  
pmcid integer  
);  
  
create table principalinvestigator (  
piid integer primary key,  
pifirstname varchar(15),  
pilastname varchar(15),  
applicationid integer references application(applicationid)  
);  
  
insert into principalinvestigator (piid, pifirstname, pilastname, applicationid) values (10860152,'YESTER','JESSIE',8457237);  
insert into principalinvestigator (piid, pifirstname, pilastname, applicationid) values (11009461,'BUCKLEY','MONICA WEAVER',8649148);  
insert into principalinvestigator (piid, pifirstname, pilastname, applicationid) values (11203978,'BABATZ','TIMOTHY D',8455499);
```